ABSTRACT

A back pressure regulator for ink-jet pen, using a cover element and recess in the pen to form a specific gap, to constantly maintains a quantity of ink to form a liquid-air interface, to prevent excess air freely to flow into the ink-jet pen, so as to act as a pressure regulator. The ink-jet pen has an orifice providing a passage in the recess for ambient air to bubble into, to prevent the back pressure from rising above a level that would cause malfunction of the pen. The recess includes at least two grooves which starts from the orifice, and provides a diversity of grooves in opposite or different directions. The grooves further having an inclined or curved bottom surface to define a gap between the cover element and the bottom surface thereof. The gap between the cover element and recess is smallest near the orifice and increases as the distance from the orifice increases. This geometry, helps to induce the bubble efficiently moving along the grooves and finally bubbles into the pen through an opening of the cover element, and is capable of constantly urges a quantity of ink toward the orifice at the smallest portion of the gap, and to seal the orifice to maintain the back pressure above a level in the pen.